

XV. *On Two Genera of Plants from Chile.* By JOHN MIERS, Esq., F.R.S, F.L.S. &c.

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AMONG the few very interesting plants which I was enabled to collect during my rapid journey over the Cordillera in 1825, were the two following, which being yet undescribed, may perhaps claim the attention of the Linnean Society. The first evidently belongs to the tribe of the *Eriogoneæ*, of which a monograph by Mr. Bentham was read before the Society in 1835, and subsequently published in the 17th volume of its Transactions. It differs from all others of the tribe in its habit, for its very slender ramifications are always dichotomously divided in every axil, and its solitary involucre, on a lengthened capillary pedicel, springs from the middle of each bifurcation; it is however easily distinguishable from the rest by the proportion of its floral parts in a manner to be presently noticed. All the *Eriogoneæ* hitherto discovered in South America have been found on the western side of the Andes, and this is probably the first instance known of their occurrence on the eastern declivity.

The learned author of the monograph above quoted, states that he does not agree with Dr. Meissner and M. DeCandolle, who infer the normal number of the stamens in the *Polygonaceæ* to be double that of the lobes of the perigonium, and that in all instances occurring with a less number of stamens, this diminution is alone attributable to the abortion of those parts. Mr. Bentham, on the contrary, shows that this relation is not at all manifest, and he endeavours to prove that the normal number of floral parts is always ternary, the six lobes of the perigonium being biserial, the nine stamens in three series, and the ovarium surmounted by three styles and three stigmata. This arrangement, however, is far from general, for the greater number of genera present only five divisions of the floral envelope, with six, eight or nine stamens. *Atraphaxis*, notwithstanding, offers a binary arrangement of its parts, viz. four lobes in the perianthium in two rows, six stamens with two styles, and two stigmata.

The discrepancies here alluded to may, however, be reconciled, if we pay attention to the following circumstances. There does not seem any apparent reason why botanists should have constantly regarded the floral envelopes in the *Polygonaceæ* as a perigonium or perianthium, words intended to express a confluence of calyx and corolla into one common floral covering; but here the parts constituting such envelope manifestly bear the usual characters of a distinct calyx and corolla, for the floral segments are divided to the base, and exhibit their origin externally upon an annular hypogynous ring, that serves to support the stamens as well as the stipitate ovarium: they are always in two or more whorls, are deeply imbricated, the external series being of a somewhat denser texture, and although petaloid, these segments have every claim to be regarded as so many sepals, while the

more internal leaflets bear the usual characters of petals. Were this distinction once admitted, and we were to conclude the normal arrangement to be ternary, and to allow the existence of an occasional binary combination, by the suppression of some of its parts, all the difficulties of its variable structure could be easily explained. In the solitary instance where the floral envelopes are only three (as in *Königia*), we might look upon it as an apetalous genus; where they consist of six lobes, the three outer may be regarded as sepals, and the others as petals; or when nine, the six interior lobes as a double row of petals. In like manner, when five in number, we may conceive the two outer lobes (which in such cases are always more exterior) to be sepals, and the other three to be petals; when four or eight, the same distinction may be made by dividing them into binary series. This hypothesis, though only a modification of Mr. Bentham's, will obviously reduce the number of deviations from the normal rule. There does not indeed appear any reason why the floral envelopes of the *Polygonaceæ* should not be entitled to the same distinction into calyx and corolla, as is admitted, for instance, in the *Polygalaceæ*, where the calyx is often comparatively large and petaloid in texture, or as in the *Portulacaceæ*, where the same occurs, and where the number of sepals (different from that of the petals) is only two, in the same manner as, according to my view, exist in *Polygonum*, *Fagopyrum*, *Coccoloba*, *Ceratogonum*, *Emex* and *Calligonum*, in which last-mentioned genus the two exterior leaflets are larger and marcescent, showing the difference of their nature from the three petals, which remain persistent about the fruit. The same decadence of the sepals and persistence of the corolla occur also in the *Portulacaceæ*. In many other genera of the *Polygonaceæ* with six floral segments, the outer series, which are different in texture, fall away, while the petals remain, investing the achenium. This view of the subject is much confirmed by the argument of Prof. Lindley\*, where he offers very cogent reasons for associating the *Polygonaceæ* with the *Caryophyllaceæ* and the *Portulacaceæ*, with which orders they agree in the unsymmetrical inconstancy of their floral parts, in their sepals being often of petaloid texture, in the insertion of their stamens upon a hypogynous ring, quite free from the petals, in their somewhat stipitate ovary, and in their farinaceous albumen enclosing a curved embryo. The *Caryophyllaceæ* have also their petioles somewhat vaginant.

All the *Eriogoneæ* hitherto known accord with the normal rule, as they present six floral segments in two series, nine stamens and three styles, but in the plant under consideration, we have an unusual deviation from the general disposition, for here we find a quaternary arrangement, the involucre being generally 4-cleft, each flower having eight distinct, very imbricated segments, eight stamens fixed upon the hypogynous support or gynophorus, and four styles and stigmata. In accordance with the views above suggested, I shall therefore consider the four outer segments as a calyx of four sepals, and the inner lobes as a corolla of four petals. I will here remark, that in the same specimen I have observed, though rarely, that some of the involucres contain flowers in which their parts are trimerous, *i. e.* three sepals, three petals, six stamens, three styles and stigmata, but the involucre in such case is still 4-pointed.

\* Vegetable Kingdom, p. 50.



In *Chorizema* and *Mucronea*, the involucre are 1-flowered, being 6-toothed in the former and bidentate in the latter; in *Eriogonum* and *Chorizanthe*, the inflorescence is generally terminal, and capitate in *Mucronea*, with three involucre, verticillately arranged in each flowering axil; but this plant, differing from all others, offers only a single stipitate involucre in each axil or dichotomy. From all these peculiarities, I naturally at first concluded it would constitute a new genus, which I proposed to call *Tetraraphis*, closely allied to the *Oxytheca* of Mr. Nuttall, described in the Journal of the Academy of Natural Sciences of Philadelphia (2nd Ser. i. 169). Although agreeing with that description in its similarity of habit, its linear radical leaves, a single few-flowered involucre in each axil, supported on a filiform pedicel, with its teeth armed with long rigid bristles, *Oxytheca* appeared to differ in its ramifications being trichotomous, in having only three sepals and three petals, and these all united in a tube nearly to the summit, in having six stamens, three styles and stigmata, in its achenium being compressed and 2-sided, and in its embryo being placed excentrically in fleshy albumen. These differences appeared sufficiently great to warrant the conclusion that the plant under consideration, though closely allied, was generically distinct from *Oxytheca*, and hence it was desirable to compare it with the Californian plant: this I had the good fortune to meet with in Sir W. Hooker's Herbarium, communicated by Mr. Nuttall himself, as an authenticated specimen of his *Oxytheca dendroidea*. I was greatly surprised, however, to find it so closely resembling my own plant in external appearance, and so like it in dimension, in the dichotomous mode of its growth, in the shape of its leaves, and in the size and aspect of its involucre and flowers, as scarcely to be distinguished from it. In my own specimen, the chief specific difference seemed to consist in the constant dichotomy of its ramifications, which are only divided into three branches at its first basal joint, in the bracts at the division of the stems not being quite divided to the base, its leaves not strongly revolute, the achenium not compressed, 2-sided and lenticular, and its flowers, with rare exceptions, being 4-merous, having their floral envelopes nearly divided to the base. Mr. Nuttall, in his generic character, states that the flowers are either dioecious or monœcious, that in the female flowers the perianth is closed to the summit and 6-toothed, that in the male and hermaphrodite flowers it is shortly 6-cleft, and he hesitatingly gives the number of stamens to be six; it must be remembered, however, that his examination was from dried specimens of plants collected by Dr. Gamble in the Rocky Mountains. As Mr. Nuttall includes in his genus *Oxytheca*, another section under the name of *Gomphotheca*, founded upon a very distinct plant, with dioecious pentamerous flowers, possessing a very different habit; as he nowhere states that the two other more legitimate species have monœcious flowers; as I have not noticed the flowers of the plant from the Chilean Andes to be otherwise than perfectly hermaphrodite; and as the floral characters of the Californian plants appear doubtfully stated, or made to include two distinct groups, and at variance in many particulars with the features I have observed,—I feel induced to remodel the generic features of *Oxytheca* in the following manner, in accordance with the facts I have carefully noticed in my own plant, modified in some degree by the circumstances stated by Mr. Nuttall.

## OXYTHECA, Nutt.

*Involucrum* 3-4 florum, tubulosum, sub-4-gonum, ad medium 4-partitum; laciniis subæqualibus, acutis, longissimè aristatis. *Flores* hermaphroditi, pedicellati, bracteati, subexserti, demùm cernui. *Sepala* 3-4, petaloidea, æqualia, oblonga, unguiculata, valdè imbricata, imâ basi cum petalis subcoalita. *Petala* 3-4, sepalis alterna et subsimilia, tenuiora, glabra, imbricata, et cum istis persistentia. *Stamina* 6-8, e summo gynophoro orta, inclusa, 3-4 alternatim breviora, sepalis opposita; *filamenta* filiformia, apice inflexa; *antheræ* rotundatæ, cordatæ, dorsifixæ. *Ovarium* ovatum, 3-4-gonum, stipitatum, petalis tertio brevius, 1-loculare; *ovulo* basilari, erecto. *Styli* 3-4, breves, erecti, demùm divaricati; *stigmata* capitata. *Achenium* monospermum, ovale, 3-4-costatum, subcompressum, sepalis petalisque emarcididis arcuè tectum. *Semen* unicum, loculum implens; *testa* membranacea. *Embryo* spiralis, antitropus, intra albumen farinaceum inclusus; *cotyledonibus* cochleato-rotundis, foliaceis, accumbentibus; *radiculâ* istis 3-plo longiore, tereti-subulatâ, hemicyclîcâ, apice recto verticem spectante.

Herbæ *suffruticulosæ Californicæ et Chilenses, Andicolæ, sesquipalmares, valdè ramosæ, ramis gracilibus, in quâque axillâ dichotomè divisis*; folia radicalia *congesta, lineari-subulata, caulina bracteiformia, axillaria, terna, basi connata, hinc breviter vaginantia*; involucrum *longè pedunculatum e quâque dichotomiâ ortum*; flores *minuti, sigillatim præcociores*; pedicelli *singulatim basi bracteâ lineari aristatâ breviorè donati*.

1. OXYTHECA SPICULATA, n. sp.; valdè ramosa, ramulis divaricatis dichotomè deliquescentibus teretibus gracilibus glanduloso-pilosis, foliis radicalibus congestis spatulato-linearibus utrinque aspero-pilosis pilis patentibus è tuberculis totidem ortis; caulinis in quâque dichotomiâ ternis bracteiformibus acutis apice mucronulatis aspero-pilosis basi in vaginam brevissimam confluentibus, pedunculo solitario gracillimè elongato, involucre 3-4-floro; laciniis longissimè aristatis, pedicellis unifloris basi bracteatis demùm exsertis, floribus cernuis 4-meris rarissimè 3-meris, sepalis hirsutulibus petalisque consimilibus glabris rubentibus.

*Hab.* in Andibus Chilensibus, descensu orientali, circa rivulum Sanctæ Mariæ, altitudine 8000 ped. *v.v.*

This plant, about 4 or 5 inches high, is very dichotomously branched. A rosulate cluster of about twenty radical leaves spring from the collar of a lengthened tap-root. The leaves, linear, spatulate and attenuated into a slender petiole, are about 8 lines long, 1 line broad, somewhat fleshy, opaque, and are covered on each side with numerous patent rigid hairs, each hair springing out of a prominent tubercle. A simple short terete stem, 8 lines in length, rises out of the cluster of leaves, and is crowned at its summit by a verticil of six acute bracts, vaginantly united at their base: out of this verticil spring three equal branches, 11 lines long, each being in succession and with regularity dichotomously divided into other more slender branchlets, and their nodes, about 10 lines distant, are each furnished at their base with three bracts, two being opposite the stems and one lateral, all equal, acute, aristate, and united into a vaginant cup about each axil: from the middle of each of the first and of each successive dichotomy rises a capillary erect peduncle, 4 lines long, bearing at its summit an urceolate involucre, the tube of which is  $\frac{3}{8}$ ths of a line long, its four lobes of similar length, each terminated by a fine needle-shaped spine  $\frac{3}{4}$  of a line long. The floral bracts are about half the length of the tube which conceals them, and are equal in number to the pedicels, which are smooth, and, when fully grown,  $\frac{3}{4}$  of a line long, each bearing a flower  $\frac{1}{2}$  of a line in length. The seed enclosed in the



marcescent but persistent floral envelopes is about  $\frac{1}{2}$  of a line long. The branchlets and peduncles are sparsely beset with very short patent hairs, bearing a resinous gland at their summit; these are different from the hairs of the leaves, bracts and calyx, which are simple, pointed, and spring out of elevated tubercles.

I found this plant, of which I was only able to collect a single specimen, in January 1825, in the main valley, on the eastern side of the great Cordillera, upon the road leading from Mendoza to Aconeagua, at a spot near the Estero de Santa Maria, which falls into the river Tunuyan, about three leagues above the Punta de las Vacas.

The second plant I have to record is a nearly aphyllous shrub, with straight, erect, virgate branches, terminating in spines, and evidently belongs to the *Bignoniaceæ*, although in many points it varies from the usual structure of that Order. In that family the ovarium, formed constantly of two carpels, is generally bilocular, with ovules commonly ascending or horizontal, attached to the margins of the dissepiment: its fruit is usually a long capsule, more or less woody, 2- or spuriously 4-celled; the seeds are numerous, generally winged, always much compressed, and their exalbuminous embryo presents broad foliaceous cotyledons, cordate at both extremities. In the present instance the ovarium is simply bilocular, with a few ovules suspended on the two faces of the thin dissepiment; the fruit is a small oval drupe, containing a single osseous indehiscent nut, which is 1-celled by abortion, and contains only a single pendulous seed that entirely fills the cavity: this is therefore quite apterous, oval, with a small thick superior radicle, and two plano-convex fleshy cotyledons, a structure quite anomalous in the Order.

I found this plant in the year 1825, upon the skirts of the eastern declivity of the Cordillera, near Mendoza, on the margin of the desert tract called "La Travesia," where it was also found by Dr. Gillies. I have proposed for it the generic name of *Oxycladus*, from ὄξυς, *acutus*, and κλάδος, *ramus*, in reference to its spiny habit.

It is evident, from the facts just stated, that this genus does not conform with any of the characters that mark the tribes into which the Order has been divided by botanists. The genera that most nearly approach it in habit are the *Catophractes* of Don, figured in the 18th volume of the Society's Transactions, plate 22, and the *Rhigozum* of Dr. Burchell, both of which are spinose shrubs from South Africa; but these have both large yellow flowers, and the seeds of the latter agree with the characters of the true *Bignoniæ*. It will therefore be necessary to place *Oxycladus* in a distinct tribe, and the Order may hence be divided into the following sections.

Tribe 1. BIGNONIÆ. Capsule dehiscient, 2-celled, 2-valved, with numerous winged compressed seeds attached to both sides of the dissepiment; embryo with flattened foliaceous cotyledons.

Tribe 2. CRESCENTIÆ. Fruit drupaceous, woody, 2- or many-celled, with numerous winged or compressed seeds; embryo with compressed fleshy cotyledons.

Tribe 3. OXYCLADEÆ. Fruit drupaceous, containing a single 1-celled, osseous, indehiscent nut, with a solitary suspended, rounded seed; the embryo having a superior radicle, with large and nearly hemispherical fleshy cotyledons.

The generic features of this genus may be thus characterized:—

OXYCLADUS, gen. nov.

*Calyx* gamophyllus, 5-dentatus, persistens. *Corolla* gamopetala; tubo cylindrico, calyce 2-3-plovc longiore, vix gibbo, limbo brevi, 5-lobo, sub-bilabiato lobis rotundatis; labio inferiori 3-lobo, lobis paululò majoribus; superiori 2-lobo, in æstivatione imbricativâ semper exteriori. *Stamina* 5, corollæ lobis alterna, quorum 4 didynama, et quinto superiori brevissimo ananthero, 2 inferioribus longioribus faucem attingentibus, 2 lateralibus istis tertio brevioribus; *filamenta* paullo supra basin tubi inserta, filiformia, glabra; *antheræ* rotundatæ, reniformes, cordatæ, 2-lobæ, connectivo dorsali cordiformi adnatæ et huic in medio lorum præfixæ, lobis ovalibus divaricatis anticè longitudinaliter dehiscentibus. *Ovarium* oblongum, pilosum, glandulâ annulari brevi 5-lobâ glabrâ cinctum, 2-loculare; *ovula* in utroque loculo circiter 6, supernè per paria collateralia, e dissepimenti nervo longitudinali seriatim appensa. *Fructus* sub-baccatus, calyce immutato clausus. *Nux* ovatus, acutus, 4-sulcatus, apice 4-denticulatus, 1-ocularis, monospermus; *semen* loculo conforme, latere superiori funiculo brevi appensum; *testa* chartacea, favoso-reticulata; *endopleura* membranacea. *Embryo* exalbuminosus; *radiculâ* superiori crassâ, apice mammillæformi; *cotyledonibus* istâ 3-plo longioribus, ovatis; plano-convexis, valdè crassis.

*Arbuscula Mendozensis* vix aphylla, spinosa, ramosissima, glaberrima, ramis nitidis, erectis; flores pauci, aggregati, parvuli; corolla cærulescens.

1. OXYCLADUS APHYLLUS; ramulis erectis virgatis teretibus nitidis rubentibus spinâ terminatis; junioribus oppositis spinæformibus floriferis, foliis bracteiformibus minimis sub flores aggregatis (an bracteis?) linearibus glabris incurvis, floribus 2-3 fasciculatis breviter pedunculatis, calyce glabro, corollâ extûs pubescente pilis recurvis cærulescente, ovario piloso.

*Hab.* prope Mendozam ad pedum Andium. Vernac. *Ala.* v.v.

This is a shrub about 8 feet high, with the habit of a woody leafless broom. The branches have a very smooth bark, of a chestnut-brown colour, almost polished, and the young branchlets that bear the flowers look like spines, being subulate and mucronate, as are also the ends of all the branches: the axils are opposite, but frequently one branch, or both, are barren, which adds more to its spinescent appearance. About two or three flowers spring out of each axil on the spine-like branchlets, bearing at the foot of the peduncles several minute, curved, smooth, linear leaflets, about half a line in length. The peduncles are about a line long; the smooth tubular calyx, crowned with five somewhat unequal, short, triangular teeth, is 3 lines in length; the corolla is tubular, of a bluish colour, and about 6 lines long; the tube is little more than a line in diameter, is pubescent outside, with reflected hairs; it has a bilabiate border formed of five short rounded lobes, which are somewhat expanded and thrown back; the attachment of the filaments at their apex is upon the anterior face of the anthers, and on the connective between the two divaricating lobes, contrary to the general rule of the Order. The fruit is a subfleshy pubescent drupe, enclosed in the persistent and scarcely enlarged calyx, and it contains an oval osseous nut, 3 lines long, 2 lines in diameter, pointed, 4-grooved, and surmounted by four minute teeth; a single seed fills its cavity, suspended by a short thread from the dissepiment, which is pressed against one side of the cell, and upon which may still be seen the abortive ovules; the embryo is exalbuminous, with an obtuse superior radicle,

terminated by a small, dark-coloured mammilla; the cotyledons are thick and fleshy, four times the length of the radicle, and of equal diameter.

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EXPLANATION OF THE PLATES.

TAB. XVII.

- Fig. 1. *Oxytheca spiculata*: natural size.  
 Fig. 2. An involucre with a portion of its peduncle, showing the flowers exerted.  
 Fig. 3. The same, cut open to show the insertion of the pedicels and bracts.  
 Fig. 4. A young flower-bud with its pedicel and bract.  
 Fig. 5. A bract seen before and behind.  
 Fig. 6. A flower with a portion of its pedicel.  
 Fig. 7. The same, with the sepals thrown back to show the petals.  
 Fig. 8. The same, with the sepals and petals removed, exhibiting the stamens inserted upon the gynophorus.  
 Fig. 9. An anther seen in front.  
 Fig. 10. The same, seen from behind, showing how the filaments are attached.  
 Fig. 11. The pistil upon its stipitate gland or gynophorus, with the stamens removed.  
 Fig. 12. The same, with the styles become reflexed.  
 Fig. 13. A longitudinal section of the same, showing the erect ovule.  
 Fig. 14. The achenium enclosed in the persistent and withered floral envelopes.  
 Fig. 15. The same, with the floral covering removed.  
 Fig. 16. The seed.  
 Fig. 17. A longitudinal section of the seed, showing the embryo enclosed in its albumen.  
 Fig. 18. The embryo extracted.

N.B. Figs. 2, 3, 4 & 5 are magnified on the same proportion.

Figs. 6, 7, 8 & 12 to 18 are more highly magnified upon one equal scale.

TAB. XVIII.

- Fig. 1. *Oxycladus aphyllus*.  
 Fig. 2. A flower, showing the mode of æstivation of the corolla.  
 Fig. 3. The same, expanded.  
 Fig. 4. A corolla, cut open to show the stamens.  
 Fig. 5. An anther, viewed in front; showing the insertion of the filament upon the anterior side of the connective, and the pollen-cells in the act of dehiscence.  
 Fig. 6. The same, seen from behind.  
 Fig. 7. The same, after dehiscence.  
 Fig. 8. The pistil, seated upon its hypogynous gland within the calyx, which is cut open and folded back, to show its unequal teeth.  
 Fig. 9. The stigma, seen in front.  
 Fig. 10. The same, shown edgeways.  
 Fig. 11. The ovarium, seated upon its hypogynous glandular cup.



- Fig. 12. A vertical section of the ovarium, across the dissepiment; showing the mode of attachment of the ovules.
- Fig. 13. The drupe, enclosed in the persistent calyx.
- Fig. 14. The same:—magnified.
- Fig. 15. The same, with the calyx removed.
- Fig. 16. The nut.
- Fig. 17. A vertical section of the nut.
- Fig. 18. The seed, with its testa and podosperm.
- Fig. 19. The embryo, extracted.

N.B. Figs. 1, 2, 3 & 13 are of the natural size.

Figs. 4, 8, 11, 12 & 14 to 19 are magnified.

Figs. 5, 6, 7, 9 & 10 are more highly magnified.